

## ABSTRACT

In one method, a zinc concentrate is leached as elemental sulfur and other by-products are stripped from the surfaces of the particles in the concentrate by means of a grinding machine such as a ball mill. The ferric ion consumed by leaching is regenerated for recycled use by introducing oxygen into the post-leaching solution flowing through feed pipes. This method can shorten the leach time by a substantial degree.

In another leaching method, a solution containing free sulfuric acid and ferrous ions and a zinc concentrate are charged into an autoclave having a pressurized atmosphere and as oxygen gas is supplied, the internal temperature is adjusted between 90 °C and 120 °C, whereby the ferrous ion in the solution is oxidized to increase the ferric ion concentration to 2 - 60 g/L whereas pressurized leaching of the zinc concentrate is performed simultaneously. Following this one-step oxidative leaching process, the resulting slurry is subjected to a grinding/leaching step in which by-product elemental sulfur is stripped from the surfaces of the particles in the leached zinc concentrate and, thereafter, the slurry from the grinding/leaching step is subjected to another pressurized leaching step.